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THE NEW ENGLAND BOTANICAL CLUB

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THE OLDER TYPES OF NORTH AMERICAN VIOLETS.—I.

E. Brainerd.

An earnest effort has been made to ascertain what specific types were before the older students of Viola when they published their American species. The task is indeed a difficult one, as the type specimen is usually not extant, and the description often brief and inadequate. In some instances it would seem that the problem must be abandoned as insoluble. But as we get a clearer knowledge of our plants in the field, and learn to distinguish specific differences from fluctuating variability, we may hope also to make progress in identifying the older specific names. Fortunately, absolute proof is not necessary; if we can get nothing better, we may be content with a reasonable degree of probability.

V. obliqua Hill (Hortus Kew. 1769.) In the judgment of many students of the genus, this, the oldest name for one of our cordate-leaved violets, though published with a figure, is hopelessly vague. A species so ill-defined that Pursh could think that *V. blanda* was intended, Schweinitz that it stood for *V. cucullata,* and LeConte that it might be *V. rotundifolia,*— not to speak of its recent interpretation as *V. papilionacea* and *V. affinis,*— must surely be discarded as past recognition.

The status of the three allied species, V. cucullata, V. papilionacea and V. affinis, is much alike, and they may be best discussed together. It is now less than a decade since Prof. Greene put forth his interpretation of these old species, which for over sixty years had been merged into one. We could wish that the proof were more positive as to what Aiton, Pursh, and LeConte had before them, when giving these several names; but recent students of Viola seem

convinced that the weight of evidence sustains Prof. Greene's conclusions. Aiton's statement regarding *V. cucullata*, that the lateral petals are longer than the spurred petal, is to me a strong indication that we have correctly identified his species. Schweinitz had a most distinct and accurate conception of the plant, but unfortunately regarded it as *V. obliqua* Hill. LeConte used instead, for the very same plant, the far less ambiguous name of Aiton, *V. cucullata*; but he gave *V. papilionacea* only varietal rank, and separated from these his *V. affinis* with such hesitancy, as not to carry conviction. "Too near the preceding," (*V. cucullata*), he says, "I can find no distinctive characters except the shorter peduncles and the broader sepals." Yet he strangely overlooks a better mark of difference, expressly stated in his descriptions, that in *V. cucullata* the spurred petal is generally naked and glabrous, (superiore [petalo] ut plurimum nudo, glabro); while in *V. affinis* it is generally villous, (superiore ut plurimum villosa). After all, as Greene remarks, LeConte's drawing, still extant, is the best evidence as to what plant he had in mind.

When, however, Torrey and Gray published the first fascicle of their North American Flora, in July, 1838, *V. papilionacea* and *V. affinis* were cited as mere synonyms of *V. cucullata*; and there the matter rested till recent years. How may we account for the wide divergence between this judgment and that of to-day? Is it not due largely to the fact that formerly this group of plants were studied only in their vernal state? The three species under discussion are small stemless herbs; in spring we see nothing above ground but half-grown leaves, and scapes bearing single flowers, all much alike. Only in late summer are marked specific characters developed; then the mature leaves, the apetalous flowers, their peduncles, sepals, capsules and ripe seeds, all reveal striking differences. The plants in petaliferous flower furnished to the early botanists only vague, hardly definable hints of specific distinctness; even Torrey and Gray could see no notable differences. But when the growing plants are at hand in late summer, a child can be taught to distinguish the species.[1]

Viola sororia Willd. was published in 1806 in the Hortus Beroliensis with a detailed description and an excellent plate (no. 72). It

[1] Dr. Gray in later years was doubtless influenced in the reduction of violet species by his knowledge of the numerous intergrading forms, that connect the extreme types of the *cucullata-sagittata* group. Whether he thought this due to recent interbreeding, or not, it would support his conception of a "most polymorphous" species.

is therefore surprising that it was so constantly misinterpreted or ignored, until correctly understood in the Illustrated Flora (1897). The description calls for a stemless, violet-flowered plant, with cordate leaves pubescent beneath and on the petioles. The only two species in eastern North America combining these characters are the one to which Dr. Britton has applied the name *V. sororia*, and the northern *V. septentrionalis*. The latter is quite unlikely to have reached Berlin; and furthermore its vernal leaves in outline and aspect do not answer as well to the Willdenow plate, as do those of the Britton plant. The confusion of the older botanists regarding Willdenow's *V. sororia* may be due in part to a palpable blunder in his description, for he calls the spurred petal bearded, and the lateral petals smooth. I say 'palpable blunder' for there is not a known violet in eastern North America that bears such a flower. Through some error of observation or of memory (not without parallel) Willdenow located the beard on the wrong petal.

The first misapplication of the name *V. sororia* was made by Nuttall, who quotes it as a synonym of *V. villosa* Walt. Nevertheless, after describing his *V. villosa* var. *cordifolia*, he somewhat inconsistently remarks, that this *latter* "is decidedly the *V. sororia* figured in the Hortus Berolinensis, although the leaf is said to be pubescent beneath instead of above." Schweinitz, Torrey and LeConte perpetuate in one form or the other the error of Nuttall.

The genuine *V. sororia* Willd. was, however, too common a plant not to have been noticed under some name. The oldest synonym is the *V. asarifolia* of Pursh.[1] This was based upon a plant of low rich woods, collected in the Carolinas by Catesby in 1724,— still to be seen at Oxford in hb. Sherard. A tracing made by Prof. Fernald shows it to be a summer specimen having large tall leaves, and bearing cleistogamous flowers and an immature capsule on peduncles less than two inches long. It is so unlike the form ordinarily seen in vernal flower, that Pursh, though recognizing *V. sororia* Willd., makes the Catesby plant another species;— a blunder made by more than one botanist, who has thought to get an adequate notion of a violet by studying it only when in petaliferous flower. Pursh adds the naïve remark, "I have seen this species several times in Virginia, but generally without flowers; which has been the reason that no specimen was in my collection."

[1] Supplement to Flora, ii. 734, 1814.

LeConte also recognized the plant under two different names. It is (1) his *V. cucullata* var. γ, as both his description and one of his figures clearly show; and (2) "*V. asarifolia* Pursh," perplexingly said to have very large villous leaves, short peduncles scarcely over an inch and a half long [aestival conditions], a naked glabrous spurred petal, and for habitat Canada and northwestern New York. [? sc. and southward.]

In recent years Willdenow's plant has been variously disposed of; Mr. Witmer Stone regards it as a form of *V. palmata dilatata* Ell.; and for Prof. Greene it has furnished material for at least four new species,— *V. laetecaerulea*, *V. cuspidata*, *V. nodosa*, and *V. Dicksonii*.

V. villosa Walter. This name was applied by the older American botanists to two quite distinct species. Elliott and LeConte, who were intimately acquainted with the plants of Walter's region, understood him to refer to a violet, found only south of Virginia, chiefly in pine-barrens,— densely and finely pubescent throughout,— a species allied to *V. fimbriatula*, and published in 1898 by Prof. Greene as *V. Carolina*. But Nuttall, and after him Schweinitz and Torrey, applied the name to a violet that grows on dry slopes among deciduous trees from southern New York to Georgia, chiefly along the eastern foothills of the Appalachian Mountains,— a small species allied to *V. papilionacea*,— marked by somewhat rigid silvery pubescence on the upper surface of the leaf, though elsewhere glabrous. Which of these two plants is the *V. villosa* of Walter? That it is the first of the above described species, can be shown I think beyond a reasonable doubt. I would present the three following points for consideration.

1. Walter tells us in his preface that nearly all the species in his Flora Caroliniana were found in a tract that might be bounded by a line of fifty miles. His house and the botanical garden, in which he was buried, were on the banks of the Santee River, near the middle of the great tide-water plain of the southern Atlantic States. No specimen of the upland plant, *V. villosa* of Nuttall, has ever been found in this tract or within a hundred miles of the home of Walter. But the other species, as I can testify after a recent visit, is here most abundant; frequent colonies occur along the old Charlestown road from Eutawville to the Walter plantation; it was seen on railway embankments and even in the streets of towns like Summerville. The plant could hardly have escaped the observation of Walter; and if noted in his Flora, it was surely under the name *V. villosa*.

2. This descriptive term better characterizes the plant of the lowlands than that of the uplands. The pubescence of the former is, indeed, rather short for the precise use of the word 'villosa'; but it is dense and soft, that of the petioles and peduncles being, as Prof. Greene puts it, "almost plushy." Mr. Pollard also says of it in Small's Southern Flora, "petioles usually densely villous."[1] But of the upland plant Prof. Greene remarks, "the accepted *V. villosa* is not villous; it is rather stiffly hirsutulous."

3. The opinions of Elliott and of LeConte are entitled to great weight regarding the point in question. Through the kindness of Prof. Paul M. Rea, the Curator of the Charlestown Museum, I had the privilege of examining the specimens of Viola in the Elliott herbarium, and found the plant that he had labelled *V. villosa* Walt. to be the species of the coastal plains. LeConte, than whom no botanist in the first half of the last century more diligently studied and more accurately discriminated the perplexing forms of Viola in the Atlantic States, is most emphatic in applying Walter's name to the plant of the coastal region, and not to the plant of the northern uplands. "When *V. villosa* is misunderstood," he justly remarks, alluding to Nuttall and Torrey, "it is simply by authors who have never seen it."[2] LeConte's description of the two species as well as his accurate figures, now in the possession of Prof. Greene, confirm these conclusions. This interpretation of *V. villosa* was adopted in Torrey and Gray's No. Am. Flora, in 1838, and is the one maintained in all the many editions of Eaton's Botany published after 1830.

The true *V. villosa* Walt. has the unique habit of bearing apetalous flowers and fruit in the winter and early spring, before bearing petaliferous flowers. Much of the autumn foliage remains green through the winter, and specimens that I collected the last week in March had abundance of ripe seed but no petaliferous flowers. In no. 31 of Greene and Pollard's distribution of No. Am. Violaceae are to be seen both flowering and fruiting specimens of this species, collected March 30 and April 19; but the fruit is from cleistogamous flowers and was evidently obtained on the earlier date, the flowers on the later.

The other species, that is currently passing as *V. villosa*, will need

[1] It should be understood that both these authors are here speaking of *V. Carolina*, apparently not suspecting it to be Walter's *V. villosa*.

[2] "Cum *V. villosa* confusa, auctoribus duntaxat quibus nunquam visa." Ann. N. Y. Lyceum, ii. 144.

to have a name of its own, and I would designate it by a similar epithet descriptive of its upper leaf-surface:—

Viola hirsutula, nom. nov. (*V. villosa* Nutt. and recent authors, not Walter; *V. sororia* LeConte and Eaton, not Willdenow).

V. villosa var. *cordifolia* Nutt. has been a source of more or less confusion. Judging from the very full description in both Nuttall and Schweinitz, it was probably based on a hybrid between *V. hirsutula* and *V. papilionacea*, found in "dry woods on the banks of the Schuylkill near Philadelphia." Such a hybrid, from two stations now within the limits of that city, I have had growing for two seasons. The plants were found in company with the two above named species, possess intermediate characters, and show much impaired fertility. But their hybrid origin is positively demonstrated by the behavior of their seedlings, which presented last summer, in strikingly diverse forms, the divergent characters of the parents. For example, some seedlings had the small leaves of *V. hirsutula*, others the large leaves of *V. papilionacea*; some bore purple capsules like *V. hirsutula*, others light green capsules like *V. papilionacea*; some produced the pale yellow seeds of *V. hirsutula*, others the almost black seeds of *V. papilionacea*. This hybrid has also been collected by Mr. W. DeW. Miller in Plainfield, N. J.; and by Prof. House in the District of Columbia, and was published by him in Rhodora viii. 121, as *V. papilionacea* × *villosa*. It should rather be designated:—

V. hirsutula × **papilionacea**. (*V. villosa*, var. *cordifolia* Nutt.; *V. cordifolia* Schweinitz; *V. villosa*, var. *cordata* Torr., Flora i. 252, 1824; the change in varietal name being plainly an inadvertence.)

Middlebury College, Middlebury, Vermont.

CATHARINAEA MACMILLANI.

Edward B. Chamberlain.

(Plate 74.)

In the spring of 1906 Miss A. L. Crockett of Camden, Maine, sent the writer a small package of mosses. On account of other duties, the specimens were not examined closely at the time. Last November, however, when the subject was again taken up, it was found that

one packet contained fruiting material of a *Catharinaea* which seemed totally unlike any species described in the current manuals. The plant was conspicuous by its small size, stiff erect habit, and its crisped, closely inrolled leaves. Microscopic study showed it to differ from the other species of the genus in its papillose leaves with numerous, large lamellae. By comparison with specimens at the New York Botanical Garden, the specimen was determined as *Catharinaea Macmillani*, a species described in 1903 by Prof. J. M. Holzinger from sterile plants collected at Ortonville, Minnesota. This determination has since been verified by Prof. Holzinger. Search in the herbarium of the New York Botanical Garden brought to light several specimens from the herbarium of the late C. F. Austin, which in all essential characteristics agreed with the plant in question. Some of these specimens bore a manuscript name, which shows that Austin had already noticed the peculiarity of the plant.

The plants show some variation in size, and in the number and height of the lamellae; but are at once distinguishable by the papillosity of the leaves and lamellae, a character which seems to be unique in the genus. Since the original collection was sterile, and the characterization of the species brief, it seems best to publish here a full description, drawn from the fruiting specimens collected by Miss Crockett, and verified by comparison with a fragment from the original collection. The species is most closely related to *Catharinaea angustata*, Brid., of which it might be regarded as a derivative due to exposed conditions. My thanks are especially due to Mrs. E. G. Britton, Prof. Holzinger, and Prof. J. F. Collins for assistance in the study of the specimens.

Catharinaea Macmillani, Holzinger. Minn. Bot. Studies. Ser. 3: Part II: 120. (1903). *Dioecious*, archegonia in the axils of the inmost comal leaves. *Gametophyte* 2–2.5 cm. high, dull olive or reddish green, brownish below. Stems erect, simple or branched from near the base, naked or with a few rhizoids below. Lowest leaves scale-like and feebly developed, gradually larger and forming irregular rosulate tufts above, patent when moist, crisped and somewhat spirally contorted when dry, oblong-linear, 2–3 × 0.5 mm., not sheathing at the base, slightly undulate in the upper third, with 2–3 oblique rows of strong dorsal teeth, acute, often ending in a spiny point. Margin of two rows of linear, thickened cells in two layers, serrate in the upper third, the teeth double and becoming more prominent toward the apex. Costa stout, semiterete, about one fifth the median width of the leaf, percurrent or nearly so, composed in cross-

section of a dorsal row of thick-walled, papillose cells, two stereid bands separated by a double row of median guides, and a ventral row of larger cells from which arise 5–9 lamellae. Lamellae minutely crenulate in side view, 6–10 cells high, terminal cell wall not noticeably thickened, but usually with 2–3 low papillae. Leaf-cells round-hexagonal above, strongly chlorophyllose, becoming more hyaline and rectangular below, median cells 12–16 μ in diameter, somewhat moniliform in section, usually with 1–3 low papillae on each surface. *Sporophyte*, usually solitary, occasionally two. Seta 30–50 mm. long slender, smooth, brownish. Capsule 1.5–2.5 × 0.5–0.7 mm., cylindric, tapering slightly at the base, erect, straight or slightly curved, smooth, areolation rectangular below with the lateral walls much thickened, five or six rows of the cells at the orifice quadrate and incrassate, darker colored. Operculum convex, rostrate, beak at times three-quarters as long as the urn, deep red. Calyptra cucullate, equalling urn, rough at the apex. Peristome nematodontoid, of 32 linear, acute, papillose teeth, from a basal membrane one third the total height, central portion red, margin pale and minutely crenulate, attached by apices to the epiphragm.

Plate 74, figures 1–9.

Illustration: Holzinger, loc. cit. pl. 19.

Habitat: dryish, sterile soil, often in large turfs.

Distribution: Ortonville, Minn., *J. M. Holzinger*, 1901. (type). Camden, Maine, *A. L. Crockett*, No. 163. 1903. North Haven, Conn., *G. E. Nichols*, 1907. Camden, N. J., *Parker*. Closter, N. J., *C. F. Austin*. Salina Co. Missouri, 1890, *C. H. Demetrio*.

New York City.

Explanation of Plate 74.

Fig. 1. Plant in dry condition, natural size.
Fig. 2. Portion of a moistened plant, × 6.
Fig. 3. Leaves from upper, median, and lower parts of the stem, × 12.
Fig. 4. Apex of leaf from back, × 25.
Fig. 5. Areolation of upper margin, median leaf, × 225.
Fig. 6. Areolation of basal margin, median leaf, × 225.
Fig. 7. Outline median cross-section of leaf, × 50.
Fig. 8. Detail of same cross-section, × 225.
Fig. 9. Portion of peristome, × 50.

A SYNOPSIS OF THE NEW ENGLAND SPECIES OF PLEUROTAENIUM.

Joseph A. Cushman.

(Plate 75.)

While the New England desmids have had much less attention given to them than has been given to those of the British Isles, there are nevertheless ten species of *Pleurotaenium* known from New England. There are but nine species of *Pleurotaenium* given in Wests' British Desmids. Four of our species have not been reported from the British Isles. The species are all comparatively large and conspicuous and are easily distinguished from one another. They fall naturally into three groups. The majority of the species of the genus have straight sides or in certain cases slightly undulate. The species of the second group including *P. nodosum* and *P. constrictum* have definite enlarged portions or annulations. The third group is represented by the single species *P. verrucosum*, which has the surface divided into rectangular areas in more or less distinct rings. Our species with their several varieties are given below and their distribution in New England as far as known. The records followed by an exclamation point are those from which specimens have been seen by the writer. In most points the recent monograph of the Wests has been followed. A key to the New England species is given here, based in part upon that of the Wests.

Pleurotaenium Nägeli, 1849.

Cells cylindrical, circular in end view, sides straight or somewhat sinuate; semicells with a basal inflation and often with secondary ones distally, apex truncate, usually with a ring of tubercles; chloroplasts several, in irregular longitudinal bands parietally arranged.

Key to the New England Species of Pleurotaenium.

I. Cells cylindrical or slightly attenuated, end view circular, sides nearly straight or very slightly sinuate toward the base of the semicell, or evenly curved from base to apex, not prominently sinuate and without a thickened surface pattern.

1. Apices furnished with a ring of tubercles.
   A. Cells broadest at or near base of semicells.
      a. Cells 10–15 times as long as wide . . . *P. coronatum.*
      b. Cells 6–9 times as long as wide . . . . *P. truncatum.*
      c. Cells 15–18 times as long as wide. . . . *P. Ehrenbergii.*
   B. Cells broadest in middle of semicells. . . . *P. subgeorgicum.*
2. Apices usually without tubercles.
   A. Cells of medium size, basal inflation not usually prominent. *P. Trabecula.*
   B. Cells very large, basal inflation prominent. *P. maximum.*

II. Cells with a surface pattern of quadrilateral thickenings, ends circular. *P. verrucosum.*

III. Cells with a few broad constricted areas, sides very sinuate. *P. constrictum.*

IV. Cells with rings of nodules, end view sinuate-stellate. *P. nodosum.*

Pleurotaenium coronatum (Bréb.) Rabenh., Flor. Europ. Algar., III, 1868, p. 143; *Docidium coronatum* Bréb., in Ralfs, Brit. Desm., 1848, p. 217, Pl. XXXV, f. 6; Wolle, Desm. U. S., 1884, p. 49, Pl. XI, f. 9–10. Cells large, 10–15 times as long as wide, gradually attenuated from base to apex, prominent basal inflation, sides undulate, apex truncate with 6–8 blunt tubercles. Length 340-575 μ; breadth at base 34–63 μ; apex 27–40 μ.— Me.: Bridgeton! N. H.: Noone's Station!; Pudding Pond, North Conway! Mass.: Lake Quinsigamond, Worcester (*Stone*); Plainville! Randolph! Bridgewater!

P. coronatum var. fluctuatum West, Jour. Linn. Soc. Bot., Vol. XXIX, 1892, p. 118, Pl. XIX, fig. 11. Cells considerably larger than in the typical form, 12-14 times as long as broad, sides of semicells undulate for their entire length. Length 850-900 μ; breadth at base 65-72 μ; apex 46–50 μ — N. H.: Intervale! Mass.: Lake Watuppa, Fall River! This is one of the largest of our desmids and is easily visible without a lens. It is not common.

P. coronatum var. nodulosum (Bréb.) West, Jour. Linn. Soc. Bot., Vol. XXIX, 1892, p. 119. *Docidium nodulosum* Bréb. in Ralfs, Brit. Desm., 1848, p. 155, Pl. XXVI, fig. 1. Semicells with the basal inflation and apical tubercles much reduced. Length 560 μ; breadth at base 65 μ; apex 46 μ.— Mass.: Amherst (*W. West*); Salem (*Bailey*). R. I.: Wainskut pond, North Providence (*Bailey*). I have not found this variety myself in New England although it has several times been reported by others. The measurements are given from an Ohio specimen which was typical.

P. TRUNCATUM (Bréb.) Näg., Gatt. Einz. Alg., 1849, p. 104. *Closterium truncatum* Bréb. in Chev., Micr., 1839, p. 272. *Docidium truncatum* Bréb. in Ralfs, Brit. Desm., 1848, p. 156, Pl. XXVI, fig. 2; Wolle, Desm. U. S., 1884, p. 48, Pl. IX, figs. 6 & 7. Cells large, 6–9 times as long as wide, decidedly attenuated towards the apex, 11–15 apical tubercles, their bases depressed below the actual end of the semicell; cell wall coarsely punctate. Length 450–520 μ; breadth 53–80 μ; apex 37–45 μ.— Me.: Orono (*Harvey, W. West*). Mass.: Pondville! Carver's Pond, Bridgewater! This does not appear to be common in New England, as it has appeared in but two of the many lots of material examined. It seems to be common in the British Isles, however, and has a wide distribution elsewhere.

P. EHRENBERGII (Bréb.) DeBary, Conj., 1858, p. 75. *Docidium Ehrenbergii* Bréb. in Dict. Univ. Hist. Nat., 1844, Vol. V, p. 93. Cells of medium size, 15–18 times as long as wide, somewhat attenuated towards the apices, a basal inflation and one or two additional ones above it; apices with 7–9 tubercles, cell wall punctate. Length 350–496 μ; breadth 21–32 μ; apex 12.5–19 μ.— Mass.: Tewksbury (*Lagerheim*)! Randolph! Halifax! Lake Watuppa, Fall River! Nantucket! Although this is the most frequent species of the genus in the British Isles according to the Wests, in New England there are other species that occur more frequently.

P. EHRENBERGII var. ELONGATUM West, Jour. Linn. Soc. Bot., Vol. XXIX, 1892, p. 119. Cells narrow and much elongated, about 25 times longer than the diameter. Length 573–660 μ; breadth 25–30 μ; apex 19–22 μ.— N. H.: Púdding Pond, North Conway! Mass.: Halifax!

P. EHRENBERGII var. UNDULATUM Schaarschm., Magyar Tudom. Akad. Math. s. Termeszettud. Kozlemenyek., Vol. XVIII, 1882, p. 278, Pl. I, fig. 21. Cells larger than in the typical form and with the sides undulate throughout their length. Length 496 μ; breadth 25 μ; apex 15 μ.— N. H.: Pudding Pond, North Conway!

P. TRABECULA (Ehrenb.) Näg., Gatt. Einz. Alg., 1849, p. 104, Pl. VI, fig. A. *Closterium Trabecula* Ehrenb., Beitr. zur Kentniss der Organis. der Infus., 1830, p. 62. *Docidium Trabecula* Wolle, Desm. U. S., 1884, p. 48, Pl. IX, figs. 2–4, Pl. XII, figs. 1–7. Cells large, 9–19 times as long as wide, sides of semicells nearly straight, apices rounded truncate, usually without tubercles. Length 320–620 μ; breadth at base 25–44 μ; apex 23–27 μ.— Me.: Orono (*Har-*

vey); Kittery, common! N. H.: North Woodstock! Noone's Station! Mass.: Near Salem (*Bailey*); Amherst (*W. West*); Reading! Plainville! Carver's Pond, Bridgewater! Long Pond, Tewksbury! Nantucket!

P. Trabecula forma granulatum G. S. West, Jour. Bot., Vol. XXXVII, 1899, p. 113, Pl. CCCXCVI, fig. 6. "Cell wall distinctly and irregularly granulate." Length 505 μ; breadth at base of semicells 34 μ; apex 28 μ.— N. H.: Mt. Moosilauke!

P. Trabecula forma clavatum (Kütz.) W. & G. S. West, Bot. Trans. Yorks. Nat. Union, Vol. V, 1902, p. 58. *Docidium clavatum* Kütz. in Ralfs, Brit. Desm., 1848, p. 156, Pl. XXVI, fig. 3; Wolle, Desm. U. S., 1884, p. 48, Pl. IX, fig. 8. "Cells about 12 times longer than their diameter; semicells slightly tumid and subclavate." Length 360 μ; breadth at base, 31 μ; apex 25 μ.— Mass.: West Bridgewater!

P. Trabecula var. rectum (Delp.) W. & G. S. West, Brit. Desm. Vol. I, 1904, p. 212, Pl. XXX, figs. 9-10. *Pleurotaenium rectum* Delp., Mem. R. Accad. Scienze di Torino, ser. 2, Vol. XXX, 1877, p. 129, Pl. XX, figs. 8–11. Cells smaller than the typical, 12–15 times as long as wide. Length 250 μ; breadth at base of semicells 18.5 μ; apex 15 μ.— N. H.: North Woodstock! Mass.: North Eastham (*F. S. Collins*)!

P. subgeorgicum Cushman, Rhodora, Vol. VII, 1905, p. 117, Pl. LXI, fig. 4. Cells large, 12–15 times as long as wide, semicells widest at a point more than midway from the isthmus, thence tapering gradually to either end; basal portion with several inflations, remaining portion of the sides smooth; apex truncated, with a crown of 10 bluntly rounded tubercles. Length 600-700 μ; breadth at base 30–35 μ; at middle of semicells 45–58 μ; apex 25–30 μ.— N. H.: North Woodstock!

P. maximum (Reinsch) Lund., Nova Acta Reg. Soc. Scient. Upsala, ser. 3, Vol. VIII, 1871, p. 89. *Docidium maximum* Reinsch, Spec. Gen. Alg., 1867, p. 140, Pl. XX. C, figs. 1–2. *D. Archeri* Wolle, Desm. U. S., ed. II, 1892, p. 51, Pl. XII, fig. 2. Cells large, 14–18 times as long as wide; apices truncate with rounded angles; prominent basal inflation. Length 600–850 μ; breadth at base 40–55 μ; apex 22–30 μ.— Me.: Orono (*W. West*). Mass.: Amherst (*W. West*).

P. indicum (Grun.) Lund., Nova Acta Reg. Soc. Scient. Upsala, ser. 3, Vol. VIII, 1871, p. 90. *Docidium indicum* Grun., Desmid. Banka, 1865, p. 13, Pl. II, fig. 18. Length 630 μ; breadth at base

21 μ; apex 16 μ.— Mass.: Tewksbury (*Lagerheim*). This species rests upon this record and could not be verified although many of the records of Lagerheim have been gone over by the writer from some of the material from which Lagerheim took his desmids. For the present it must remain as a single record.

P. CONSTRICTUM (Bail.) Wood, F. W. Algae N. Am., 1873, p. 121. *Docidium constrictum* Bail. in Ralfs, Brit. Desm., 1848, p. 218, Pl. XXXV, fig. 7. Wolle, Desm. U. S., 1884, p. 50, Pl. XI, fig. 2. Cells large, 12–15 times as long as wide, very slightly attenuated from base to apex; a prominent basal inflation and three or four others in each semicell; apices truncate with a peripheral ring, usually 8 large bluntly pointed tubercles, membrane evenly punctate; basal inflation occasionally with small plications, usually 8 in number. Length 435–560 μ; breadth at base 40–50 μ; apex 25–32 μ.—N. H.: Laconia, scarce, (*Wests*); Pudding Pond, North Conway! Mass.: Tewksbury (*Lagerheim*). R. I.: Worden's Pond, North Providence (*Bailey*).

P. NODOSUM (Bail.) Lund., Nova Acta Reg. Soc. Scient. Upsala, ser. 3, Vol. VIII, 1871, p. 90. *Docidium nodosum* Bailey in Ralfs, Brit. Desm., 1848, p. 218, Pl. XXXV, fig. 8. Wolle, Desm. U. S., 1884, p. 50, Pl. XI, figs. 11–12, Pl. XII, fig. 20. Cells large, 7–10 times as long as wide, semicells with rings of nodules, usually four in number including the basal ring and equidistant, 6–8 nodules in each ring; apices dilated, with a ring of 6–8 tubercles. Length 300–460 μ; breadth at base 40–70 μ; apex 28–40 μ.— Me.: Orono (*Harvey*). N. H.: Laconia (*Wests*); Pudding Pond, North Conway! Intervale! Noone's Station! Mass.: Near Salem (*Bailey*); Lake Quinsigamond, Worcester (*Stone*); Carver's Pond, Bridgewater! R. I.: Wainskut Pond, North Providence (*Bailey*). This seems to be one of the commonest species of the genus in New England. It is rare in the British Isles.

P. VERRUCOSUM (Bail.) Lund., Nova Acta Reg. Soc. Scient. Upsala, ser. 3, Vol. VIII, 1871, p. 6. *Closterium verrucosum* Bail., Am. Jour. Sci., n. s. Vol. I, 1846, p. 127, fig. 4. *Docidium verrucosum* Bail. in Ralfs, Brit. Desm., 1848, p. 218. Wolle, Desm. U. S., 1884, p. 52, Pl. X, figs. 4–5. Cells of medium size, about 10–15 times as long as wide, semicells with straight sides, slight inflation at the base, cell wall with 13–15 rings of irregularly quadrilateral areas, the last ring distally more elongated than the others. Length 400–460 μ; breadth at base 30–40 μ; apex 22–30 μ.— N. H.: Pudding Pond, North Conway, frequent! Mass.: Mt. Everett (*Wolle*). R. I.: Near Providence (*Bailey*).

Explanation of Plate 75.

Fig. 1. Pleurotaenium coronatum (Bréb.) Rabenh., × 351.
Fig. 2. " truncatum (Bréb.) Näg. (after W. & G. S. West) × 310.
Fig. 3. " Ehrenbergii (Bréb.) DeBary, × 350
Fig. 4. " Trabecula (Ehrenb.) Näg., × 350.
Fig. 5. " subgeorgicum Cushman, × 350.
Fig. 6. " constrictum (Bail.) Lund., × 350.
Fig. 7. " nodosum (Bail.) Lund., × 350.
Fig. 8. " verrucosum (Bail.) Lund., × 350.

Streptopus oreopolus a possible hybrid.—In April, 1906, I described from the alpine region of Mt. Albert, Gaspé Co., Quebec, as *Streptopus oreopolus*[1] a plant which in some ways combined characteristics of *S. amplexifolius* and *S. roseus*, but in its deep claret-colored perianth was unlike either. The original description was based upon simple or subsimple alpine specimens, and at that time the plant was known only from a limited area on Mt. Albert.

During the summer of 1906, however, Professor J. Franklin Collins and the writer found *Streptopus oreopolus* in company with *S. amplexifolius* and *S. roseus* abundant along alpine brooks on the northern hornblende slopes of Mt. Albert, and in extreme abundance everywhere on alpine meadows and in the open park-like subalpine forests of the granitic tableland of Table-top Mountain. In fact, on Table-top Mountain *S. oreopolus* impresses one as perhaps the most abundant plant of the cool slopes and alpine meadows, always more abundant than *S. roseus* and *S. amplexifolius*, maintaining its slightly ciliate-hispid stems and leaves (pronouncedly less ciliate than in *S. roseus*) and its attractive flowers, in form and structure like those of *S. amplexifolius* but always a deep claret-purple in color.

Since the fruit of this local plant of the Gaspé mountains was still unknown we took special interest in examining daily, through our four weeks' residence in the alpine areas, the colonies of *Streptopus*. The result of a very close observation of the plants over an area of about one hundred square miles was that, while both *S. roseus* and *S. amplexifolius* were found to mature abundant fruit, not a single plant of *S. oreopolus* could be found with even a vestige of good fruit. In

[1] Rhodora, viii, 70 (1906).

fact, all the plants examined had merely dry shriveled and hollow ovaries. This uniform sterility of *S. oreopolus* throughout its known range suggests that it may not be a self-perpetuating species; yet, if this should prove to be the case, the profusion of the plant throughout the area and the constancy with which it maintains its characteristic pubescence and the color of its perianth is indeed remarkable. It is of course possible that the sterility of the plants in 1906 was exceptional and due perhaps to the extremely dry weather during early summer, the valley of the lower St. Lawrence experiencing a drouth quite unprecedented in that ordinarily cold and humid region, or that it depends for fertilization upon some insect which was affected by the adverse season; but the abundant fruiting of *S. roseus* and *S. amplexifolius* indicates that the unusual dryness had no adverse effect upon those species.

It is worth recording that in the mountains of Gaspé *Streptopus amplexifolius* and *S. roseus*, as well as *S. oreopolus*, show a great variation in size. All three plants in rich subalpine woods become very tall and branched, often 1 m. or more in height, but in alpine situations they are much reduced, the simple or subsimple stems 2 or 3 dm. high.— M. L. Fernald, Gray Herbarium.

The thirteenth annual meeting of the Josselyn Botanical Society will be held at Oxford, Maine, from Monday to Saturday, July 1–6, 1907, inclusive. The headquarters of the society will be at the Belmont Lodge Hotel, Oxford. Boats upon Thompson Lake will be at the disposal of the party and it is planned to make one all day excursion upon the lake. An opportunity will also be given to visit the famous orchid swamps at Hebron. To secure the favorable rates given below, it is absolutely necessary to know immediately how many members will attend. You are requested, therefore, to communicate your plans to the undersigned at once, whether planning to attend or not. Reduced rates of 1¾ cents per mile have been secured on the Maine Central Railroad, and its is expected that a similar rate will obtain upon the Grand Trunk Railroad.' Hotel Rates: One or two in room $2.00 per day. - Edward B. Chamberlain, 38 West 59th Street, New York City.

Thirteenth Annual Field Meeting of the Vermont Botanical and Bird Clubs will be held at No. Pownal, Vt. on Tuesday and Wednesday, July 2 and 3. Headquarters will be at Hotel Glenwood, where the members and their friends will assemble on the evening of July 1. Tuesday, July 2, will probably be given to exploring the cliff region of Pownal Center. Wednesday, July 3, will be devoted to the bog regions of the river valley.

There are three routes which may be taken by the Vermont members in reaching No. Pownal, as follows,

Route 1, via Bellows Falls, Brattleboro, Greenfield, No. Adams, No. Pownal.

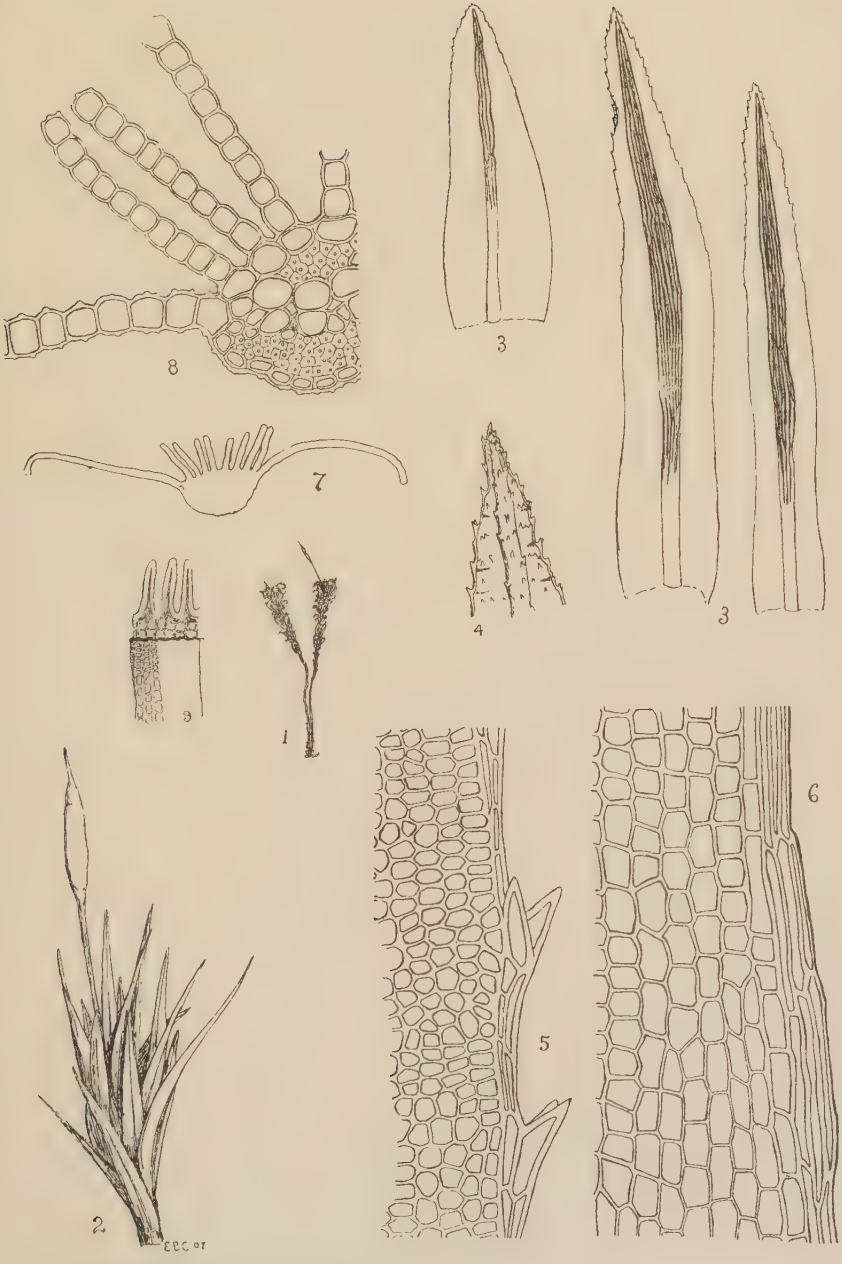
Route 2, via Rutland, No. Bennington, Hoosac Junct., No. Pownal.

Route 3, via Rutland, Castleton, Eagle Bridge, No. Pownal.

Members taking Route 2, upon reaching No. Bennington may choose between going via Hoosac Junct. to No. Pownal, or via Bennington, Petersburg Junct., to No. Pownal, or may transfer at Bennington to electric car.

Electric cars now run through Pownal from Hoosac Junct. Williamstown and Bennington. Rates at Hotel Glenwood, $1.00 per day.— D. S. Carpenter, Sec'y Arrangements, Middletown Springs, Vt.

(*Vol. 9, no. 101, including pages 77–92, was issued 3 June, 1907.*)



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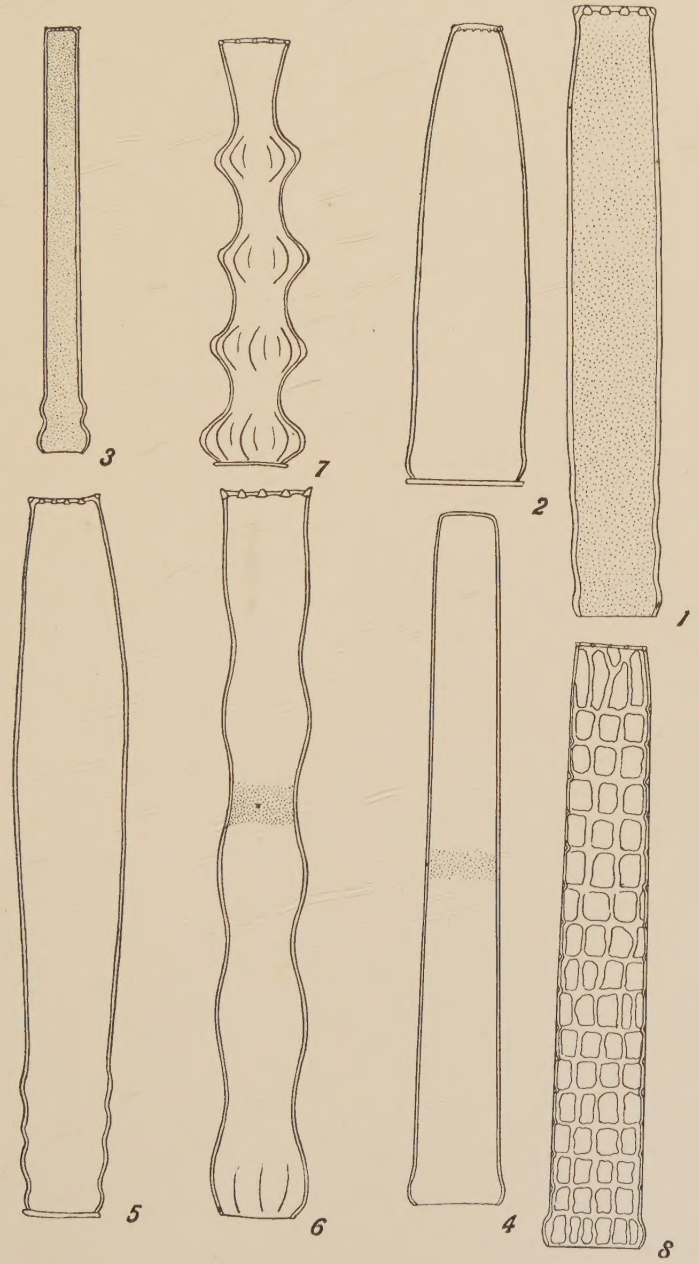

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